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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/731,945

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John C. Waldrop III

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9765

7590

07/11/2006

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EXAMINER

STAICOVICI, STEFAN

ART UNIT

PAPER NUMBER

1732

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/731,945

Applicant(s)

WALDROP ET AL.

Examiner

Stefan Staicovici

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-33 is/are pending in the application.
- 4a) Of the above claim(s) 28-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on April 26, 2006 has been entered.

### ***Response to Amendment***

2. Applicants' amendment filed April 26, 2006 has been entered. Claims 13-33 are pending in the instant application.

### ***Election/Restrictions***

3. Newly submitted claims 28-33 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 28-33 are directed to a molding apparatus classified in class 425, subclass 389. The originally claimed invention was drawn to a molding process classified in class 264, subclass 510. The apparatus as claimed can be used to practice another and materially different process, such as a vacuum molding process in which a liquid is introduced into the second vacuum chamber to apply uniform pressure on the

perform located in the first vacuum chamber. It is noted that the preamble of dependent claims 29-33 recited a "method." However, independent claim 28, from which claims 29-33 depend, is drawn to an apparatus. Further clarification is required.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 28-33 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "suitable" in claim 16, line 2, is a relative term that renders the claim indefinite. The term "suitable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention.

Claim 17 is rejected as a dependent claim.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 13-14, 16-18, 22, 25 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Lang *et al.* (US Patent No. 6,406,659 B1).

Regarding claim 13, Lang *et al.* ('659) teach the claimed process of a vacuum assisted resin transfer molding process including, assembling a preform (193) onto a mold (183), wrapping said preform using an inner vacuum bag (185) to form a first vacuum chamber, positioning a spacer system (191) onto said inner bag, placing an outer vacuum bag (189) onto said spacer system (191) to form a second vacuum chamber (see col. 8, lines 47-64 and Figure 8), evacuating said first and second vacuum chambers to form a differential pressure (see col. 7, lines 23-30), thereby generating temporary resin channels, and infusing a resin into said preform in a vacuum-assisted device (see col. 7, lines 30-39).

In regard to claim 14, Lang *et al.* ('659) teach applying a vacuum to the first vacuum chamber prior to resin infusion in order to eliminate entrapped air bubbles, hence teaching debulking of the preform prior to resin infusion (see col. 3, lines 7-10).

Specifically regarding claims 16-17, Lang *et al.* ('659) teach assembling a preform from a plurality of fiber reinforcement and insert layers (see col. 2, lines 52-65).

Regarding claim 18, it is submitted that the temporary resin channels act as passive vacuum chambers because they fill with resin and then redistribute the resin for impregnation of the fiber preform (see col. 3, lines 50-54).

In regard to claim 22, Lang *et al.* ('659) teach a breather layer positioned between the inner and outer vacuum bags (see col. 6, lines 65-67).

Specifically regarding claim 25, Lang *et al.* ('659) teach generating a differential pressure between the first and second vacuum chambers (see col. 7, lines 23-30). Hence, it is submitted that in order to obtain a differential pressure the vacuum levels in the first and second vacuum chambers must be different. Further, in order to have different vacuum levels, then each of the first and second vacuum chambers must be connected to first and second vacuum systems (pump, tube, connection) that are independent of each other.

Regarding claim 27, Lang *et al.* ('659) teach a first vacuum chamber formed by the inner bag (185) and the mold (183). Further, Lang *et al.* ('659) teach a second vacuum chamber formed by the outer bag (189) and the mold (183), wherein the second vacuum chamber includes the inner bag (185) (see Figure 8).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of Johnson (US Patent No. 4,132,755).

Lang *et al.* ('659) teach the basic claimed process as described above.

Regarding claims 15 and 19, Lang *et al.* ('659) do not teach tackifying the preform by heating the first vacuum chamber prior to applying vacuum. White *et al.* ('725) teach molding a fiber composite including, providing a fiber preform that includes a tackifier resin, partially curing (heating) the tackifier resin to form a tackified preform, impregnating said tackified preform with a resin and co-curing the tackifier resin and the impregnated resin to form the fiber composite (see Abstract). It would have been obvious for one of ordinary skill in the art to first heat the fiber reinforced preform in order to tackify said preform as taught by White *et al.* ('725) in the double vacuum bag process of Lang *et al.* ('659) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

10. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of McClure *et al.* (US Patent No. 6,090,335).

Lang *et al.* ('659) teach the basic claimed process as described above.

Regarding claims 20-21, Lang *et al.* ('659) do not teach a resin flow distribution medium between the inner bag and the fibrous reinforcement. McClure *et al.* ('335) teach a vacuum resin infusion process including, providing a resin flow control medium that forms a screen of open space that tends to wick the resin (fill fibers that act as weirs to the infusing resin) (see col. 1, lines 50-55). It is submitted that the purpose of a resin distribution medium is to control the infusion flow and to create flow resistance because a resin distribution system forms a screen of open space that tends to wick the resin. Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin flow control medium as taught by McClure *et al.* ('335) in the process of Lang *et al.* ('659) because, McClure *et al.* ('335) specifically teach that a resin flow control medium creates a uniform and homogeneous resin flow, hence improving product quality.

11. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of McClure *et al.* (US Patent No. 6,090,335) and in further view of Imanara *et al.* (US Patent No. 5,364,584).

Lang *et al.* ('659) in view of McClure *et al.* ('335) teach the basic claimed process as described above.

Regarding claim 23, Lang *et al.* ('659) in view of McClure *et al.* ('335) do not teach an infusion direction that is tilted at an angle from the horizontal. Imanara *et al.* ('584) teach a molding process of a fiber reinforced matt including tilting the mold at an angle (see Figure 1). It would have been obvious for one of ordinary skill in the art to have tilted that mold assembly as



taught by Imanara *et al.* ('584) in the process of Lang *et al.* ('659) in view of McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

In regard to claim 24, Imanara *et al.* ('584) teach that injection of resin occurs at a lower portion such that resin flows upwardly, hence against gravitation. Therefore, it would have been obvious for one of ordinary skill in the art to have injected resin at a lower portion of a mold such that resin flows against gravitation as taught by Imanara *et al.* ('584) in the process of Lang *et al.* ('659) in view of McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting and injecting resin against gravitation reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

12. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of Stoeberl (US Patent No. 4,120,632).

Lang *et al.* ('659) teach the basic claimed process as described above.

Regarding claim 26, Lang *et al.* ('659) do not teach throttling the vacuum lines. Stoeberl ('132) teaches a vacuum molding process in which a resin is infused into a preform position in a mold cavity (see Figures 3c and 2b). Further, Stoeberl ('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). It is submitted that the uniform distribution of resin in Stoeberl ('132) by throttling the vacuum line results in equal mass flow rate of resin throughout the preform and the vacuum line. Therefore, it would have been obvious for one of ordinary skill

in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Lang *et al.* ('659) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

### ***Response to Arguments***

13. Applicants' remarks filed April 26, 2006 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

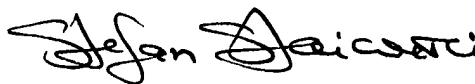
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson, can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

A handwritten signature in black ink that reads "Stefan Staicovici". The signature is stylized with a large, sweeping initial 'S'.

Primary Examiner

7/2/06

AU 1732

July 7, 2006